Salesforce Mobile Push Notifications Implementation Guide

Salesforce, Spring '17

@salesforcedocs

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MOBILE PUSH NOTIFICATIONS OVERVIEW

Mobile push notifications allow Force.com mobile application developers to easily push notifications to their users' mobile devices when business events occur in the customers' organizations.

Salesforce push notifications use the connected app framework. They support customer apps built in-house and partner or ISV apps installed via managed packages.

Business events in the customer's organization are trapped using Apex triggers that specify the notification message payload and recipient users. The push feature hands off notifications to services operated by device OS vendors, such as Apple or Google, for subsequent delivery to customers' mobile devices.

To handle events that Apex triggers can't catch, the push notifications resource of the Chatter REST API provides an alternative mechanism.

Note: These instructions do not apply to Marketing Cloud apps. To implement Marketing Cloud MobilePush notifications, see developer.salesforce.com/docs/atlas.en-us.mc-sdks.meta/mc-sdks/mobile-push-sdk.htm.

IN THIS SECTION:

Push Notification Registration and Flow
To enable push notifications, you register with several different entities and configure the required settings.

Push Notification Registration and Flow

To enable push notifications, you register with several different entities and configure the required settings.

Entities involved when sending a push notification include:

- The OS vendor that delivers the notification to devices
- The Salesforce organization that sends the notification
- The mobile devices that receive and display the notification

This is an outline of the registration process for developers.

1. Register with the mobile OS vendor, such as Apple or Google, for push service.
2. Create a connected app in Salesforce to upload the push credentials, such as the iOS `.p12` certificate or the Android token.
3. Enable the mobile client app to handle push notifications using the Salesforce Mobile SDK.
4. Write Apex triggers to send push notifications when certain events occur on Salesforce records.
5. (For partners only) For partners who are developing the push notification triggers for other customer organizations, this additional step should be performed.

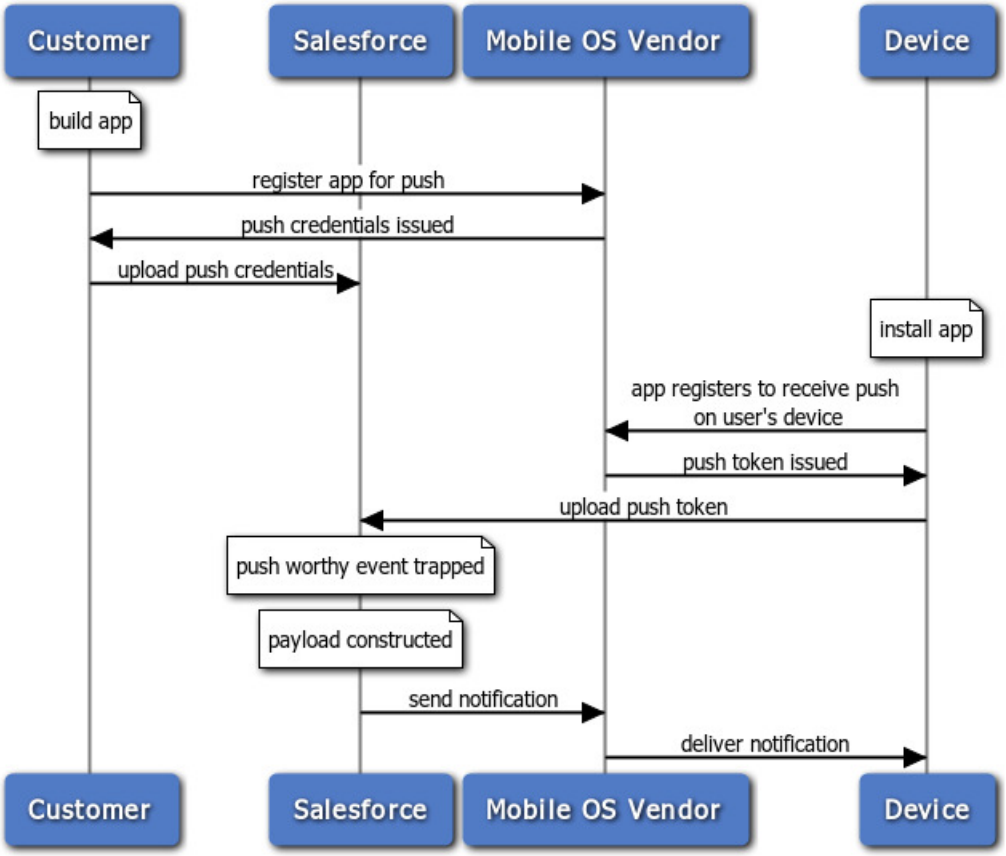
   Create a managed package containing the connected app and Apex triggers. Distribute this package to customer organizations.

The following figure illustrates the complete push notification flow for customers who develop their own mobile apps and Apex triggers. The flow consists of the following sequence of events:

1. Developer registration with the OS vendor (Apple in this figure)
2. Connected app setup in Salesforce
3. Sending the push notification via the trigger from the Salesforce organization

4. Delivery of the push notification to mobile devices by the OS vendor

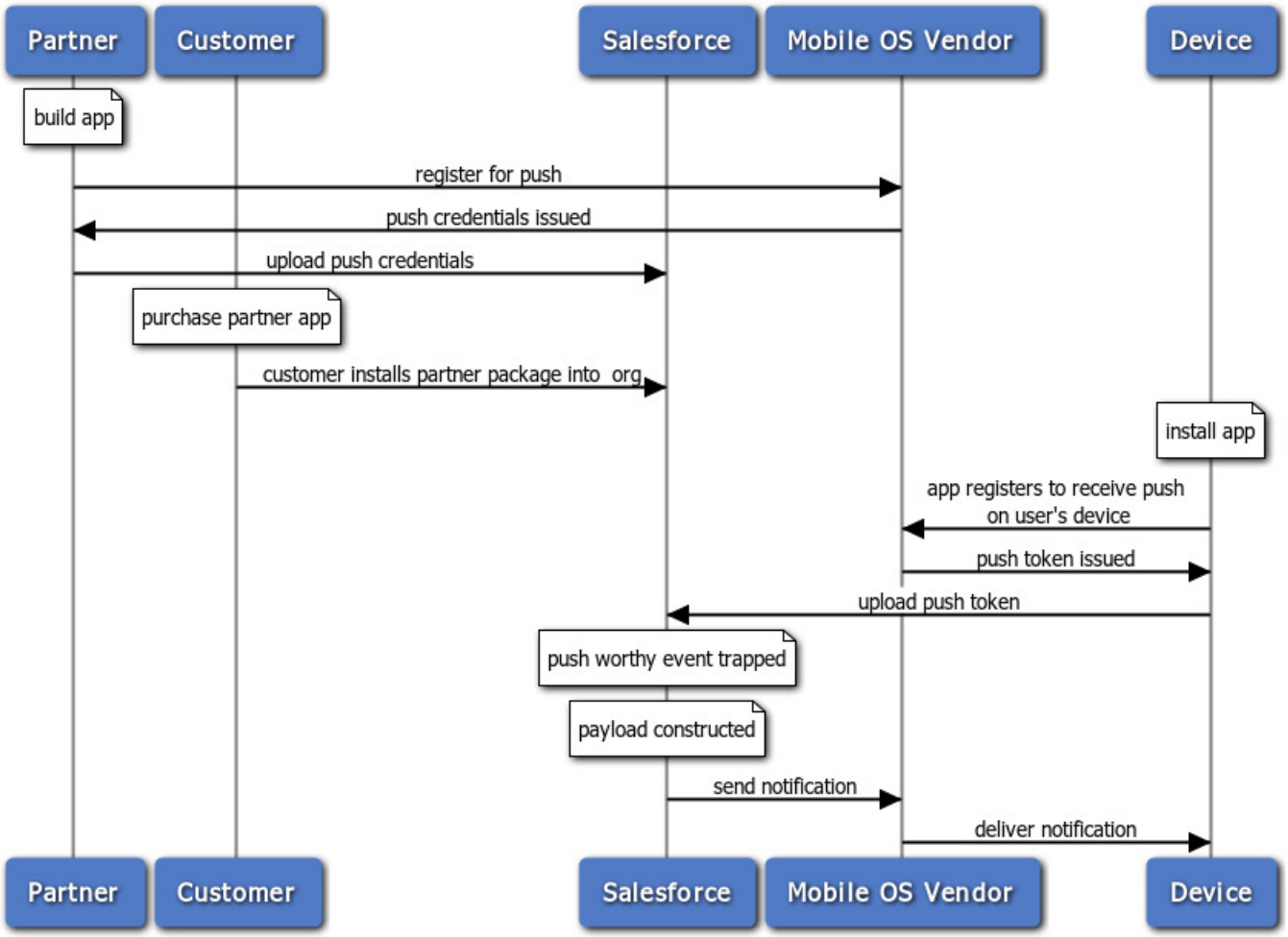
Push Notification Flow for Customers



Salesforce sends the message to the users specified in the `send` call of the Apex `Messaging.PushNotification` class.

This next figure illustrates the complete push notification flow for partners and customers. In addition to the flow represented in the previous diagram, this flow includes steps for customers who have installed the partner's package. It includes purchase of the partner app, and installation of the partner's package to get the connected app and the Apex triggers. The last few steps of sending and delivering the push notification are similar to the previous flow.

Push Notification Flow for Partners and Customers



STEPS FOR IMPLEMENTING MOBILE PUSH NOTIFICATIONS

To implement mobile push notifications, you configure each of the participating technologies.

IN THIS SECTION:

Step 1. Developer Registration with Mobile OS Vendors

This step asks the OS vendor to be prepared to handle Salesforce push notifications sent to your app. Developer registration also provides some information you'll need to finish configuring your Salesforce connected app.

Step 2. Creating a Connected App

Once you've registered your mobile app with the OS vendor's push service, the next step is to create a connected app in Salesforce.

Step 3. Configure Your Mobile SDK App

In your Mobile SDK app, implement push notification protocols required by Salesforce and the device OS provider.

Step 4. Using Apex Triggers to Send Push Notifications

After registering with the mobile OS vendor for push notification service and creating a connected app, you can send push notifications to a mobile client app using Apex triggers.

Step 5. Packaging Components for Customer Organizations

To distribute the Apex triggers and the connected app to customers, partners can create a managed package.

Step 1. Developer Registration with Mobile OS Vendors

This step asks the OS vendor to be prepared to handle Salesforce push notifications sent to your app. Developer registration also provides some information you'll need to finish configuring your Salesforce connected app.

To register your mobile client app, follow the process for your target mobile OS.

Android Registration

When developing an Android app that supports push notifications, remember these key points:

- You must be a member of the Android Developer Program.
- You can test GCM push services only on an Android device with either the Android Market app or Google Play Services installed. Push notifications don't work on an Android emulator.

Salesforce sends push notifications to Android apps through the Google Cloud Messaging for Android (GCM) framework. See http://developer.android.com/google/gcm/index.html for an overview of this framework.

To begin, create a Google API project for your app. Your project must have the GCM for Android feature enabled. See http://developer.android.com/google/gcm/gs.html for instructions on setting up your project.

The setup process for your Google API project creates a key for your app. Once you've finished the project configuration, you'll need to add the Key for Server Applications (API Key) from GCM to your connected app settings.

Note: Push notification registration occurs at the end of the OAuth login flow. Therefore, an app does not receive push notifications unless and until the user logs into a Salesforce org.

iOS Registration

When developing an iOS app that supports push notifications, remember these key points:

- You must be a member of the iOS Developer Program.
- You can test Apple push services only on an iOS physical device. Push notifications don't work in the iOS simulator.
- There are no guarantees that all push notifications will reach the target device, even if the notification is accepted by Apple.
- Apple Push Notification Services setup requires the use of the OpenSSL command line utility provided in Mac OS X.

Before you can complete registration on the Salesforce side, you need to register with Apple Push Notification Services (APNS).

Registration with APNS requires the following items.

Certificate Signing Request (CSR) File
Generate this request using the Keychain Access feature in Mac OS X. You'll also use OpenSSL to export the CSR private key to a file for later use.

App ID from iOS Developer Program
In the iOS Developer Member Center, create an ID for your app, then use the CSR file to generate a certificate. Next, use OpenSSL to combine this certificate with the private key file to create an `appkey.p12` file. You'll need this file later to configure your connected app.

iOS Provisioning Profile
From the iOS Developer Member Center, create a new provisioning profile using your iOS app ID and developer certificate. You then select the devices to include in the profile and download to create the provisioning profile. You can then add the profile to Xcode. Install the profile on your test device using Xcode's Organizer.

When you've completed the configuration, sign and build your app in Xcode. Check the build logs to verify that the app is using the correct provisioning profile. To view the content of your provisioning profile, run the following command at the Terminal window:
`security cms -D -i <your profile>.mobileprovision`

For detailed instructions see:

- Local and Push Notification Programming Guide at https://developer.apple.com/library/mac
- http://www.raywenderlich.com/32960/

Step 2. Creating a Connected App

USER PERMISSIONS	
To read, create, update, or delete connected apps:	"Customize Application" AND either "Modify All Data" OR "Manage Connected Apps"
To update all fields except Profiles, Permission Sets, and Service Provider SAML Attributes:	"Customize Application" AND either "Modify All Data" OR "Manage Connected Apps"
To update Profiles, Permission Sets, and Service Provider SAML Attributes:	"Customize Application" AND "Modify All Data"

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

Connected Apps can be created in: **Group**, **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Connected Apps can be installed in: **All** Editions

To install and uninstall connected apps:	"Customize Application" AND either "Modify All Data" OR "Manage Connected Apps"
To install and uninstall packaged connected apps:	"Customize Application" AND either "Modify All Data" OR "Manage Connected Apps" AND "Download AppExchange Packages"

Once you've registered your mobile app with the OS vendor's push service, the next step is to create a connected app in Salesforce.

The Salesforce connected app enables you to provide the registration certificate or token of your mobile client app so that Salesforce can send push notifications. Also, the connected app provides the unique API name that identifies the mobile app to send notifications to.

IN THIS SECTION:

Create a Connected App for Android

Create a Connected App for Apple iOS

Testing Your Connected App Push Configuration

To run a quick test of your push notification setup, use the Send Test Notification page. The Send Test Notification page lets you troubleshoot round-trip push notifications in a synchronous mechanism without having to configure Apex or REST calls. It can also provide insights into what's going on behind the scenes in the asynchronous environment of real-world push notifications.

Create a Connected App for Android

To create a connected app, log in to your Salesforce Developer Edition org and perform these steps.

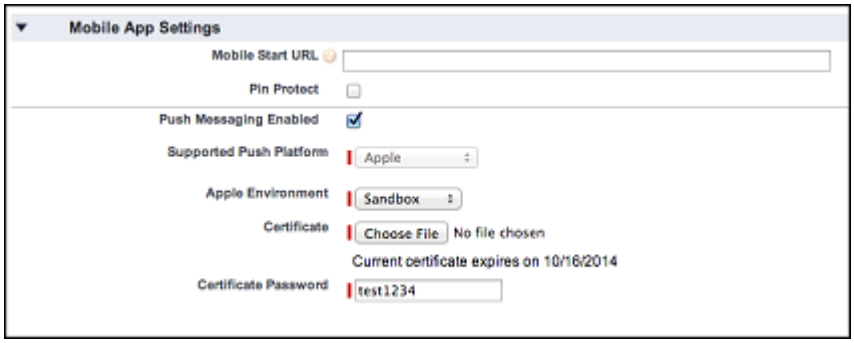
1. From Setup, enter *Apps* in the `Quick Find` box, then select **Apps**.
2. In the Connected Apps section, click either **Edit** next to an existing connected app, or **New** to create a new connected app.
3. If you're creating a new connected app:
   a. Enter a unique name for your connected app. The API name field is auto-filled.
   b. Optionally, fill in other fields, such as a description for your connected app.
   c. Enter a contact email address.
   d. In the OAuth Settings section, select **Enable OAuth Settings**.
   e. Enter a callback URL.
   f. Select OAuth scopes. At a minimum, select **Access and manage your data (api)** and **Perform requests on your behalf at any time (refresh_token)**.
4. Under Mobile App Settings, select **Push Messaging Enabled**.
5. For Supported Push Platform, select **Android GCM**.
6. For Key for Server Applications (API Key), enter the key you obtained during the developer registration with Google.

7. Click **Save**.
   After saving a new connected app, you'll get a consumer key. Mobile apps use this key as their connection token.

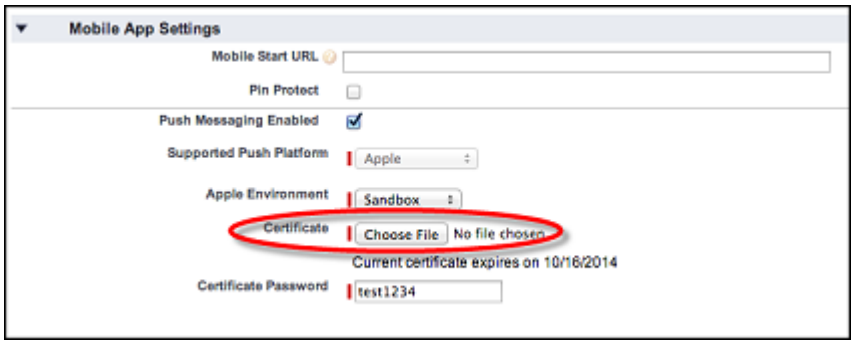
Create a Connected App for Apple iOS

To create a connected app, log in to your Salesforce Developer Edition org and perform these steps.

1. From Setup, enter *Apps* in the `Quick Find` box, then select **Apps**.
2. In the Connected Apps section, click either **Edit** next to an existing connected app, or **New** to create a new connected app.
3. If you're creating a new connected app:
   a. Enter a unique name for your connected app. The API name field is auto-filled.
   b. Optionally, fill in other fields, such as a description for your connected app.
   c. Enter a contact email address.
   d. In the OAuth Settings section, select **Enable OAuth Settings**.
   e. Enter a callback URL.
   f. Select OAuth scopes. At a minimum, select **Access and manage your data (api)** and **Perform requests on your behalf at any time (refresh_token)**.
4. Under Mobile App Settings, select **Push Messaging Enabled**.
5. For Supported Push Platform, select **Apple**.
   When you select the **Supported Push Platform** option, the dialog expands to show more settings.



6. Select the Apple environment that is valid for your APNS push notifications certificate.
7. For Certificate, select the `.p12` certificate file that you received from APNS when you registered your app for push notifications (for example, `appkey.p12`).



8. Enter the password for your `.p12` certificate file.

Testing Your Connected App Push Configuration

To run a quick test of your push notification setup, use the Send Test Notification page. The Send Test Notification page lets you troubleshoot round-trip push notifications in a synchronous mechanism without having to configure Apex or REST calls. It can also provide insights into what's going on behind the scenes in the asynchronous environment of real-world push notifications.

EDITIONS

Available in: both Salesforce Classic and Lightning Experience

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Connected Apps can be installed in: **All** Editions

USER PERMISSIONS

To send a push notification from the Test Push Notifications page:

- "Author Apex"

  AND

  "Manage Connected Apps"

About the Send Test Notification Page

The Send Test Notification page uses information from your Apple Push Notification Service (APNS) or Google Cloud Messaging for Android (GCM) setup to configure a synchronous push mechanism. You select a device to receive the push notification by entering a connection token string. If you don't know the token string, you can use the Search tool to select from the list of devices that are registered for your connected app. The Search tool automatically displays the five most recently registered devices. You can also enter a user's name to search for devices that are registered to that user.

For Android GCM push notifications, you can select the Dry Run option to test your GCM setup. This option sends the notification to the GCM server but does not forward it to a device.

Each push attempt returns a status message that indicates success or failure. See Error Messages for Push Notifications for explanations of messages. For additional information, see:

- developer.apple.com for information on Apple APNS push notifications.
- developer.android.com for information on GCM for Android push notifications.

To reach the test page:

1. In Setup, enter *Apps* in the `Quick Find` box, then select **Apps**.
2. Click the name of your connected app.
3. Click **Send test notification** next to Supported Push Platform. This link appears only if you've configured your connected app to support mobile push notifications.

Important: Successful test push notifications apply against the push notification daily limits for your organization.

IN THIS SECTION:

Send Test Push Notifications to APNS

To run a quick test of your push notification setup for Apple Push Notification Service (APNS), use the Send Test Notification page.

Send Test Push Notifications to GCM for Android

To run a quick test of your push notification setup for Google Cloud Messaging for Android (GCM), use the Test Push Notifications page.

Check a User's Mobile Push Registrations

From a User page in your organization, an administrator can easily check which of the user's devices are currently registered for push notifications. Checking the registrations may help you troubleshoot push notification failures.

SEE ALSO:

Error Messages for Push Notifications

Push Notification Limits

Send Test Push Notifications to APNS

To run a quick test of your push notification setup for Apple Push Notification Service (APNS), use the Send Test Notification page.

1. Enter a connection token string in the Recipient field, OR search for a recipient by clicking Search , and then select one of the search results. By default, the Search results list displays the five devices most recently registered for your connected app.
   a. To find other devices, enter a user name in the Search text box.
   b. Click **Go** to generate a list of all devices currently registered under that user name.
2. Optionally, for Alert, enter an alert message or dictionary per Apple's specifications.
3. For Badge, enter a badge number or `0` for no badge.
4. For Sound, enter the name of a sound file in the application bundle, or enter `default` to use the system default alert sound.
5. Optionally, to use a custom payload, enter your payload's JSON value in the Custom Payload field.
6. Click **Send** to send the test push notification, or click **Clear** to reset the form.

Send Test Push Notifications to GCM for Android

To run a quick test of your push notification setup for Google Cloud Messaging for Android (GCM), use the Test Push Notifications page.

1. Enter a connection token string in the Recipient field, OR search for a recipient by clicking Search , and then select one of the search results. By default, the Search results list displays the five devices most recently registered for your connected app.
   a. To find other devices, enter a user name in the Search text box.
   b. Click **Go** to generate a list of all devices currently registered under that user name.
2. For Payload, enter a JSON value that contains your message.
3. To send the push notification to the GCM server only, select **Dry Run**.
4. Click **Send** to send the test push notification, or click **Clear** to reset the form.

Check a User's Mobile Push Registrations

From a User page in your organization, an administrator can easily check which of the user's devices are currently registered for push notifications. Checking the registrations may help you troubleshoot push notification failures.

1. In Setup, enter `Users` in the `Quick Find` box, then select **Users**.
2. Select a user's name from the Full Name column.
3. Under User Detail, click **View** next to Mobile Push Registrations.

Note: If a device you expected doesn't appear in the list, it doesn't necessarily mean that the device isn't properly configured. Mobile push registrations are volatile and depend on the device state as well as the mobile app state.

Step 3. Configure Your Mobile SDK App

In your Mobile SDK app, implement push notification protocols required by Salesforce and the device OS provider.

Follow the instructions for your target mobile platform (Android, iOS, or hybrid).

IN THIS SECTION:

Enable Push Notifications in a Salesforce Mobile SDK Android App

Enable Push Notifications in a Salesforce Mobile SDK iOS App

Enable Push Notifications in a Salesforce Mobile SDK Hybrid App

Enable Push Notifications in a Salesforce Mobile SDK Android App

1. Add an entry for `androidPushNotificationClientId`.
   a. In `res/values/bootconfig.xml` (for native apps):

   ```
   <string name="androidPushNotificationClientId">1234567890</string>
   ```

   b. In `assets/www/bootconfig.json` (for hybrid apps):

   ```
   "androidPushNotificationClientId": "1234567890"
   ```

   This example value represents the project number of the Google project that is authorized to send push notifications to Android devices.

   Note: Behind the scenes, Mobile SDK automatically reads this value and uses it to register the device against the Salesforce connected app. Each time the user re-opens the app, Mobile SDK automatically renews the registration. This validation allows Salesforce to send notifications to the connected app.

   A device becomes unregistered if:

   - The app goes unused for an extended period of time

     OR

   - The user logs out of the app

2. Create a class in your app that implements `PushNotificationInterface`. `PushNotificationInterface` is a Mobile SDK Android interface for handling push notifications. `PushNotificationInterface` has a single method, `onPushMessageReceived(Bundle message)`.

   ```
   public interface PushNotificationInterface {
       public void onPushMessageReceived(Bundle message);
   }
   ```

   In this method you implement your custom functionality for displaying, or otherwise disposing of, push notifications.

3. In the `onCreate()` method of your `Application` subclass, call the `SalesforceSDKManager.setPushNotificationReceiver()` method, passing in your implementation of

`PushNotificationInterface`. Call this method immediately after the `SalesforceSDKManager.initNative()` call.

```
@Override
public void onCreate() {
    super.onCreate();
    SalesforceSDKManager.initNative(getApplicationContext(),
        new KeyImpl(), MainActivity.class);
    SalesforceSDKManager.getInstance().
        setPushNotificationReceiver(myPushNotificationInterface);
 }
```

Enable Push Notifications in a Salesforce Mobile SDK iOS App

Salesforce Mobile SDK for iOS provides the `SFPushNotificationManager` class to handle push registration. To use it, import `<SalesforceSDKCore/SFPushNotificationManager>`. The `SFPushNotificationManager` class is available as a runtime singleton:

```
[SFPushNotificationManager sharedInstance]
```

This class implements four registration methods:

```
- (void)registerForRemoteNotifications;
- (void)didRegisterForRemoteNotificationsWithDeviceToken:
    (NSData*)deviceTokenData;
- (BOOL)registerForSalesforceNotifications; // for internal use
- (BOOL)unregisterSalesforceNotifications; // for internal use
```

Mobile SDK calls `registerForSalesforceNotifications` after login and `unregisterSalesforceNotifications` at logout. You call the other two methods from your `AppDelegate` class.

1. Register with Apple for push notifications by calling `registerForRemoteNotifications`. Place the call in the `application:didFinishLaunchingWithOptions:` method.

```
- (BOOL)application:(UIApplication *)application
    didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
{
    self.window = [[UIWindow alloc]
        initWithFrame:[UIScreen mainScreen].bounds];
    [self initializeAppViewState];

    //
    // Register with APNS for push notifications. Note that,
    // to receive push notifications from Salesforce, you
    // also need to register for Salesforce notifications in the
    // application:
    // didRegisterForRemoteNotificationsWithDeviceToken:
    // method (as demonstrated below.)
    //
    [[SFPushNotificationManager sharedInstance]
        registerForRemoteNotifications];

    [[SFAuthenticationManager sharedManager]
        loginWithCompletion:self.initialLoginSuccessBlock
```

```
                    failure:self.initialLoginFailureBlock];

    return YES;
}
```

If registration succeeds, Apple passes a device token to the `application:didRegisterForRemoteNotificationsWithDeviceToken:` method of your `AppDelegate` class.

2. Forward the device token from Apple to `SFPushNotificationManager` by calling `didRegisterForRemoteNotificationsWithDeviceToken` on the `SFPushNotificationManager` shared instance.

```
- (void)application:(UIApplication*)application
    didRegisterForRemoteNotificationsWithDeviceToken:
        (NSData*)deviceToken
{
    //
    // Register your device token with
    // the push notification manager
    //
    [[SFPushNotificationManager sharedInstance]
        didRegisterForRemoteNotificationsWithDeviceToken:deviceToken];
    }}
```

3. Register to receive Salesforce notifications through the connected app by calling `registerForSalesforceNotifications`. Make this call only if the access token for the current session is valid.

```
- (void)application:(UIApplication*)application
    didRegisterForRemoteNotificationsWithDeviceToken:
        (NSData*)deviceToken
{
    //
    // Register your device token with the
    // push notification manager
    [[SFPushNotificationManager sharedInstance]
        didRegisterForRemoteNotificationsWithDeviceToken:deviceToken];

    if ([SFAccountManager sharedInstance].credentials.accessToken
        != nil){
        [[SFPushNotificationManager sharedInstance]
            registerForSalesforceNotifications];
    }}
```

Note: Behind the scenes, Mobile SDK automatically reads this value and uses it to register the device against the Salesforce connected app. Each time the user re-opens the app, Mobile SDK automatically renews the registration. This validation allows Salesforce to send notifications to the connected app.

A device becomes unregistered if:

- The app goes unused for an extended period of time

  OR

- The user logs out of the app

4. Add the following method to log an error if registration with Apple fails.

```
- (void)application:(UIApplication*)application
    didFailToRegisterForRemoteNotificationsWithError:
        (NSError*)error
{
    NSLog(@"Failed to get token, error: %@", error);
}
```

Enable Push Notifications in a Salesforce Mobile SDK Hybrid App

1. (Android only) If your target platform is Android:
   a. Add an entry for `androidPushNotificationClientId`. In `assets/www/bootconfig.json`:

   ```
   "androidPushNotificationClientId": "33333344444"
   ```

   This value is the project number of the Google project that is authorized to send push notifications to an Android device.

2. In your callback for `cordova.require("com.salesforce.plugin.oauth").getAuthCredentials()`, add the following code:

```
cordova.require("com.salesforce.util.push").registerPushNotificationHandler(
    function(message) {
        // add code to handle notifications
    },
    function(error) {
        // add code to handle errors
    }
);
```

Example: This code demonstrates how you might handle messages. The server delivers the payload in `message["payload"]`.

```
function(message) {
    var payload = message["payload"];
    if (message["foreground"]) {
        // Notification is received while the app is in
        // the foreground
        // Do something appropriate with payload
    }
    if (!message["foreground"]) {
        // Notification was received while the app was in
        // the background, and the notification was clicked,
        // bringing the app to the foreground
        // Do something appropriate with payload
    }
}
```

Step 4. Using Apex Triggers to Send Push Notifications

After registering with the mobile OS vendor for push notification service and creating a connected app, you can send push notifications to a mobile client app using Apex triggers.

Push notification triggers use methods in the Apex `Messaging.PushNotification` and `Messaging.PushNotificationPayload` classes. The connected app in the Salesforce organization represents the mobile client app that will receive the notifications.

Important: To send push notifications to a connected app, either of the following conditions must be met:

- Apex triggers are added in the *same organization* in which the connected app is created.
- Apex triggers are installed as part of a partner-provided managed package, along with the connected app.

Sample Apex Trigger

This sample Apex trigger sends push notifications to the connected app named *`Test_App`*, which corresponds to a mobile app on iOS mobile clients. The trigger fires after cases have been updated and sends the push notification to two users: the case owner and the user who last modified the case.

```
trigger caseAlert on Case (after update) {

    for(Case cs : Trigger.New)
    {
        // Instantiating a notification
        Messaging.PushNotification msg =
            new Messaging.PushNotification();

        // Assembling the necessary payload parameters for Apple.
        // Apple params are:
        // (<alert text>,<alert sound>,<badge count>,
        // <free-form data>)
        // This example doesn't use badge count or free-form data.
        // The number of notifications that haven't been acted
        // upon by the intended recipient is best calculated
        // at the time of the push. This timing helps
        // ensure accuracy across multiple target devices.
        Map<String, Object> payload =
            Messaging.PushNotificationPayload.apple(
                'Case ' + cs.CaseNumber + ' status changed to: '
                + cs.Status, '', null, null);

        // Adding the assembled payload to the notification
        msg.setPayload(payload);

        // Getting recipient users
        String userId1 = cs.OwnerId;
        String userId2 = cs.LastModifiedById;

        // Adding recipient users to list
        Set<String> users = new Set<String>();
        users.add(userId1);
        users.add(userId2);

        // Sending the notification to the specified app and users.
        // Here we specify the API name of the connected app.
        msg.send('Test_App', users);
```

```
    }
}
```

Sample Android Payload

The trigger sample uses `Messaging.PushNotificationPayload` to create a payload for an iOS notification. Unlike iOS, Android doesn't have special attributes or requirements for the payload; it just needs to be in JSON format. In Apex, you create the Android payload as a MAP<String,ANY> object. The `Messaging.PushNotification` class handles conversion to JSON. Here is a sample Android payload.

```
Map<String, Object> androidPayload = new Map<String, Object>();
androidPayload.put('number', 1);
androidPayload.put('name', 'test');
```

Step 5. Packaging Components for Customer Organizations

To distribute the Apex triggers and the connected app to customers, partners can create a managed package.

When customers install your managed package, they will be able to send push notifications to the connected app from their organizations when certain events occur on Salesforce records, such as updating records.

Note: Customers who install a managed package containing a connected app provided by a partner can't write their own Apex triggers to send push notifications to the connected app. This is to safeguard the partner's registration with the mobile OS vendor from abuse.

USING THE CHATTER REST API PUSH NOTIFICATION RESOURCE (OPTIONAL)

If you prefer to send push notifications without looping through the Apex engine—in other words, if you just want to push a simple message from a connected app on one mobile device to another—use the Chatter REST API push notification resource. This resource is useful for sending notifications of events that occur outside of Salesforce and can be handled entirely within the mobile connected app. You can use this resource in any type of custom app: a native Mobile SDK app, a hybrid Mobile SDK app, or an HTML5 app.

The Chatter REST API resource establishes an HTTP session to send POST requests from the sending device to one or more receiving devices. This means that:

- The sending app and the receiving apps must either be developed in the same organization or be installed from the same package.
- Only the receiving apps are required to be registered for push notifications with Apple or Google.
- Only the receiving apps are required to implement the Salesforce Mobile SDK push notification protocols.
- Each app requires a connected app, but only the receiving connected apps must be configured for push notifications.

SEE ALSO:

Push Notifications Resource

PushNotification Class

`PushNotification` is used to configure push notifications and send them from an Apex trigger.

Namespace

Messaging

Example

This sample Apex trigger sends push notifications to the connected app named *`Test_App`*, which corresponds to a mobile app on iOS mobile clients. The trigger fires after cases have been updated and sends the push notification to two users: the case owner and the user who last modified the case.

```
trigger caseAlert on Case (after update) {

    for(Case cs : Trigger.New)
    {
        // Instantiating a notification
        Messaging.PushNotification msg =
            new Messaging.PushNotification();

        // Assembling the necessary payload parameters for Apple.
        // Apple params are:
        // (<alert text>,<alert sound>,<badge count>,
        // <free-form data>)
        // This example doesn't use badge count or free-form data.
        // The number of notifications that haven't been acted
        // upon by the intended recipient is best calculated
        // at the time of the push. This timing helps
        // ensure accuracy across multiple target devices.
        Map<String, Object> payload =
            Messaging.PushNotificationPayload.apple(
                'Case ' + cs.CaseNumber + ' status changed to: '
                + cs.Status, '', null, null);

        // Adding the assembled payload to the notification
        msg.setPayload(payload);

        // Getting recipient users
        String userId1 = cs.OwnerId;
        String userId2 = cs.LastModifiedById;

        // Adding recipient users to list
        Set<String> users = new Set<String>();
        users.add(userId1);
```

```
        users.add(userId2);

        // Sending the notification to the specified app and users.
        // Here we specify the API name of the connected app.
        msg.send('Test_App', users);
    }
}
```

IN THIS SECTION:

PushNotification Constructors

PushNotification Methods

PushNotification Constructors

The following are the constructors for `PushNotification`.

IN THIS SECTION:

PushNotification()

Creates a new instance of the `Messaging.PushNotification` class.

PushNotification(payload)

Creates a new instance of the `Messaging.PushNotification` class using the specified payload parameters as key-value pairs. When you use this constructor, you don't need to call `setPayload` to set the payload.

`PushNotification()`

Creates a new instance of the `Messaging.PushNotification` class.

Signature

```
public PushNotification()
```

`PushNotification(payload)`

Creates a new instance of the `Messaging.PushNotification` class using the specified payload parameters as key-value pairs. When you use this constructor, you don't need to call `setPayload` to set the payload.

Signature

```
public PushNotification(Map<String,Object> payload)
```

Parameters

`payload`

Type:Map<String, Object>

The payload, expressed as a map of key-value pairs.

PushNotification Methods

The following are the methods for `PushNotification`. All are global methods.

IN THIS SECTION:

send(application, users)
Sends a push notification message to the specified users.

setPayload(payload)
Sets the payload of the push notification message.

setTtl(ttl)
Reserved for future use.

`send(application, users)`

Sends a push notification message to the specified users.

Signature

```
public void send(String application, Set<String> users)
```

Parameters

`application`
Type: String

The connected app API name. This corresponds to the mobile client app the notification should be sent to.

`users`
Type: Set

A set of user IDs that correspond to the users the notification should be sent to.

Example

See the Push Notification Example.

`setPayload(payload)`

Sets the payload of the push notification message.

Signature

```
public void setPayload(Map<String,Object> payload)
```

Parameters

`payload`
Type: Map<String, Object>

The payload, expressed as a map of key-value pairs.

Payload parameters can be different for each mobile OS vendor. For more information on Apple's payload parameters, search for "Apple Push Notification Service" at https://developer.apple.com/library/mac/documentation/.

To create the payload for an Apple device, see the PushNotificationPayload Class.

Example

See the Push Notification Example.

`setTtl(ttl)`

Reserved for future use.

Signature

```
public void setTtl(Integer ttl)
```

Parameters

`ttl`

Type: Integer

Reserved for future use.

`PushNotificationPayload Class`

Contains methods to create the notification message payload for an Apple device.

Namespace

Messaging

Usage

Apple has specific requirements for the notification payload. and this class has helper methods to create the payload. For more information on Apple's payload parameters, search for "Apple Push Notification Service" at https://developer.apple.com/library/mac/documentation/.

Example

See the Push Notification Example.

IN THIS SECTION:

PushNotificationPayload Methods

PushNotificationPayload Methods

The following are the methods for `PushNotificationPayload`. All are global static methods.

IN THIS SECTION:

apple(alert, sound, badgeCount, userData)
Helper method that creates a valid Apple payload from the specified arguments.

apple(alertBody, actionLocKey, locKey, locArgs, launchImage, sound, badgeCount, userData)
Helper method that creates a valid Apple payload from the specified arguments.

apple(alert, sound, badgeCount, userData)

Helper method that creates a valid Apple payload from the specified arguments.

Signature

```
public static Map<String,Object> apple(String alert, String sound, Integer badgeCount,
Map<String,Object> userData)
```

Parameters

alert
Type: String

Notification message to be sent to the mobile client.

sound
Type: String

Name of a sound file to be played as an alert. This sound file should be in the mobile application bundle.

badgeCount
Type: Integer

Number to display as the badge of the application icon.

userData
Type: Map<String, Object>

Map of key-value pairs that contains any additional data used to provide context for the notification. For example, it can contain IDs of the records that caused the notification to be sent. The mobile client app can use these IDs to display these records.

Return Value

Type:Map<String, Object>

Returns a formatted payload that includes all of the specified arguments.

Usage

To generate a valid payload, you must provide a value for at least one of the following parameters: `alert`, `sound`, `badgeCount`.

Example

See the Push Notification Example.

apple(alertBody, actionLocKey, locKey, locArgs, launchImage, sound, badgeCount, userData)

Helper method that creates a valid Apple payload from the specified arguments.

Signature

```
public static Map<String,Object> apple(String alertBody, String actionLocKey, String locKey, String[] locArgs, String launchImage, String sound, Integer badgeCount, Map<String,Object> userData)
```

Parameters

alertBody
Type: String

Text of the alert message.

actionLocKey
Type: String

If a value is specified for the *actionLocKey* argument, an alert with two buttons is displayed. The value is a key to get a localized string in a `Localizable.strings` file to use for the right button's title.

locKey
Type: String

Key to an alert-message string in a `Localizable.strings` file for the current localization.

locArgs
Type: List<String>

Variable string values to appear in place of the format specifiers in *locKey*.

launchImage
Type: String

File name of an image file in the application bundle.

sound
Type: String

Name of a sound file to be played as an alert. This sound file should be in the mobile application bundle.

badgeCount
Type: Integer

Number to display as the badge of the application icon.

userData
Type: Map<String, Object>

Map of key-value pairs that contains any additional data used to provide context for the notification. For example, it can contain IDs of the records that caused the notification to be sent. The mobile client app can use these IDs to display these records.

Return Value

Type: Map<String, Object>

Returns a formatted payload that includes all of the specified arguments.

Usage

To generate a valid payload, you must provide a value for at least one of the following parameters: `alert`, `sound`, `badgeCount`.

Apex Limits Functions for Push Notifications

Use the Apex limits functions for push notifications to get usage information.

`System.Limits` class:

`getLimitMobilePushApexCalls()`
Returns the total number of Apex calls that are allowed per transaction for mobile push notifications.

`getMobilePushApexCalls()`
Returns the number of Apex calls that have been used by mobile push notifications during the current metering interval.

Push Notifications Resource

Send a mobile push notification to connected apps on users' devices. This resource is only accessible when the session is established with a connected app that is developed in the same organization or installed in the same package as the recipient's connected app.

Resource

```
/connect/notifications/push
```

Available version
31.0

Requires Chatter
No

HTTP methods
POST

Request body for POST

Root XML tag
`<pushNotification>`

JSON example

```
{    "appName" : "TestApp",
     "namespace" : "abc",
     "userIds" : ["005x00000013dPK", "005x00000013dPL"],
     "payload" : "{'aps':{'alert':'test', 'badge':0, 'sound':'default'}}"
}
```

Properties

Name	Type	Description	Required or Optional	Available Version
`appName`	String	The API name of the connected app that the push notification is sent to.	Required	31.0
`namespace`	String	The namespace of the connected app that the push notification is sent to.	Required if the namespace is set	31.0

Name	Type	Description	Required or Optional	Available Version
`payload`	String	The push notification payload in JSON format.	Required	31.0
`userIds`	String[]	The push notification recipient user ids.	Required	31.0

Request parameters for POST

Parameter Name	Type	Description	Required or Optional	Available Version
`appName`	String	The API name of the connected app that the push notification is sent to.	Required	31.0
`namespace`	String	The namespace of the connected app that the push notification is sent to.	Required if the namespace is set	31.0
`payload`	String	The push notification payload in JSON format.	Required	31.0
`userIds`	String[]	The push notification recipient user ids.	Required	31.0

Push Notification Limits

Push notification limits apply to test push notifications as well as to production notifications.

Note: The limits described here are for core Salesforce push notifications. They do not apply to Marketing Cloud MobilePush notifications. For further information on Marketing Cloud usage, see developer.salesforce.com/docs/atlas.en-us.mc-sdks.meta/mc-sdks/mobile-push-sdk.htm.

The maximum push notifications allowed for each mobile app associated with your Salesforce org depends on the type of app.

Mobile application type	Maximum notifications per app per day
Provided by Salesforce (for example, Salesforce1)	50,000
Developed by your company for internal employee use	35,000
Installed from the AppExchange	5,000

Only *deliverable* notifications count toward this limit. For example, consider the scenario where a notification is sent to 1,000 employees in your company, but 100 employees haven't installed the mobile application yet. Only the notifications sent to the 900 employees who have installed the mobile application count toward this limit.

Each test push notification that is generated through the Test Push Notification page is limited to a single recipient. Test push notifications count toward an application's daily push notification limit.

Error Messages for Push Notifications

If you get an error message while sending a push notification from the Send Test Notification page, check the following table for suggestions on how to fix the error.

Message	Suggested Resolution
Daily push rate limit has been exceeded for this connected application	Because the daily limit is nonnegotiable, no resolution is available.
Certificate is not accepted by Apple Push Notification service	Replace the certificate with a valid type.
Certificate is revoked	Supply valid certificate.
Certificate expired	Renew certificate.
Certificate not valid yet	Retry later.
Invalid certificate or password	Replace the certificate with a valid type.
Invalid recipient or payload	Check your input for errors.
Payload exceeds maximum size	Reduce size of payload.
Unable to load push notifications settings	Confirm that settings are present on connected app.
Recipient field contains invalid device token	Provide valid device token.
Invalid device token length	Token was entered incorrectly or is corrupt. Re-enter token.
Error while sending notification. Confirm certificate is for the correct Apple environment.	Confirm that correct certificate is being used (for example, sandbox versus production).
Apple Push Notification service is unavailable.	Retry later.
Unable to connect to Apple Push Notification service	Retry later.
Unable to connect to Salesforce proxy. Contact Salesforce support if issue persists.	Retry later.
Request blocked by Salesforce proxy. Contact Salesforce support if issue persists.	Retry later.
Apple Push Notification service returned unknown error	Contact Apple or retry later.
Badge must be a number	Re-enter the badge value as an integer.
Payload must be in a valid JSON format	Format payload correctly.
You must enter a value for at least one of the following fields: Alert, Badge, Sound, or Custom Payload	Enter a valid value for one of the fields.
Recipient is required	Provide device token.
Google Cloud Messaging authentication error	Consult the GCM documentation at developer.android.com. Possible causes: • Authorization header is missing or contains invalid syntax.

Message	Suggested Resolution
	• Invalid project number was sent as key. • Key is valid, but GCM service is disabled. • Request originated from a server that is not white-listed in the server key IP addresses.
Internal error in the Google Cloud Messaging server, or the server is temporarily unavailable	Retry later.
Registration ID in the Recipient field is formatted incorrectly	Verify that mobile app is providing valid registration ID, or manually enter valid registration ID.
Payload exceeds maximum size	Reduce size of payload.
Recipient field contains registration ID that is not valid for the connected application's API server key	Provide correct server key for the app.
Recipient is required	Select recipient or provide registration ID.
Recipient field contains invalid registration ID	Update recipient's device registration ID.
GCM server returned an unexpected error. Please contact the SFDC support team.	Contact salesforce.com.
An unexpected error occurred. Please contact the SFDC support team.	Contact salesforce.com.

Debug Log Events

The mobile push notification service logs events that are useful to understand when you are monitoring an Apex debug log.

Events

The following events are supported:

- `PUSH_NOTIFICATION_INVALID_APP`
- `PUSH_NOTIFICATION_INVALID_CERTIFICATE`
- `PUSH_NOTIFICATION_INVALID_NOTIFICATION`
- `PUSH_NOTIFICATION_NO_DEVICES`
- `PUSH_NOTIFICATION_NOT_ENABLED`
- `PUSH_NOTIFICATION_SENT`

For more information on these events, log levels and categories, and how to use the Developer Console or monitor a debug log, see the *Force.com Apex Code Developer's Guide*.

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